

Fact Sheet – Structure Technical Issues

Local Seismic Safety Retrofit Program

January 24, 2007

Background:

The September 2006 quarterly report published by the Local Assistance Program indicates that there are 491 locally owned bridges that are in the Pre-Strategy or Design phase. Many of these bridges had structural designs completed in the middle to late 1990's. Since the mid-1990's considerable changes have been made to the Departments design standards.

Per the Chapter 11 of Local Assistance Procedures Manual¹, projects must meet Caltrans standards to ensure federal participation. This Fact Sheet briefly describes major areas of change and is intended as an aid to those developing projects. Each project must be evaluated independently to determine the extent of changes necessary meet these conditions.

Geotechnical/Seismology Issues:

- ARS curves have been revised and are found in the Caltrans Seismic Design Criteria v1.4².
- Additional faults or new information on previously identified faults have been placed in the errata for Caltrans Seismic Hazard Map 1996³.
- Liquefaction and near fault effects must be considered, see "Guidelines For Structures Foundation Reports"⁴ dated March 2006.

Analysis/Design Issues:

- Memos To Designers 20-1 "Seismic Design Methodology" dated April 1990, updated January 1999.
- Memos To Designers 20-7 "Use of Ductility Procedures and Tools in the Seismic Retrofit of Bridges" dated February 1994.
- Interim Policy on restrainers at hinges and joints of simply supported spans is expected to be released in Spring 2007
- Memos To Designers 20-4 "Earthquake Retrofit Analysis for Single Column Bridges" dated October 1995, interim memo to be released Spring 2007.
- Memos To Designers 20-9 "Splices in Bar Reinforcement Steel" dated August 2001.
- Memos To Designers 20-12 "Site Seismicity for Existing and Temporary Bridges Carrying Public Vehicular Traffic" dated February 2003.
- Steel bridges should meet the requirements of "GUIDE SPECIFICATIONS FOR SEISMIC DESIGN OF STEEL BRIDGES", dated December 2001 (1ST EDITION)
- SDC Section 7.8 "Abutments" dated June 2006. SDC requirements have replaced BDA Section 14 "Seismic" dated September 1989 regarding abutment stiffness design.

¹ [Local Assistance Procedures Manual](#)

² [Caltrans Seismic Design Criteria v1.4](#)

³ [California Seismic Hazard Map 1996](#)

⁴ [Guidelines for Structures Foundation Reports](#)

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Specification Issues:

The construction specifications and estimates will be updated based on Caltrans' 2006 Standard Specifications⁵ and amended using the Standard Special Provisions⁴. A partial list of major specification changes that may affect retrofits are listed below:

- Standard Specifications, Section 90: The entire chapter, has been revised several times since 1994.
- Welding: Welding quality control now stringently follows the American Welding Society requirement. Welding changes affect column casings, piling, sign structures and rebar special provisions.
- Piling: New technologies have changed how piles are analyzed and constructed. In particular large diameter caisson specifications and construction techniques have evolved significantly in recent years.
- Bearings and Couplers: Testing and new technologies and have changed how these elements are designed and used on bridges. This has resulted in new materials and specifications. An example is a wider use of spherical bearings.

Cost Estimate Issues

- The bridge cost index has risen from 204 in 1995 to 460 in 2005. Considerable escalation has been seen since 2003.

Other References

- Local Assistance Program Guidelines⁶ - Chapter 7 describes program requirements.
- Local Bridge Seismic Safety Retrofit Program webpage⁷ – information regarding program guidelines, program status, candidate projects, and specific project information.
- Local Assistance Webpage⁸ - Provide general information regarding the Local Assistance Program.
- Office of Special Funded Projects, Project Development web page⁹ – Provides project development information for structures projects.

⁵ [Caltrans Standard Specifications](#)

⁶ [Local Assistance Program Guidelines](#)

⁷ [Local Bridge Seismic Safety Retrofit Program webpage](#)

⁸ [Local Assistance Web Page](#)

⁹ [OSFP- Project Development](#)